

Conditions

if $\cos x = (-5/13)$ and $\tan x < 0$, then find $\sin 2x$

Solution

$$\cos x = -\frac{5}{13}$$

$$x = \pm \arccos \frac{5}{13} + 2\pi n$$

$$\tan x < 0$$

$$\tan x = \frac{\sin x}{\cos x} = -\frac{13\sin x}{5}, \text{ then } \sin x > 0$$

$$\sin^2 x + \cos^2 x = 1$$

$$\sin^2 x = 1 - \frac{25}{169} = \frac{144}{169}$$

$$\sin x = +\frac{12}{13}$$

$$\sin 2x = 2\sin x \cos x = -\frac{10}{13} \sin x = -\frac{120}{169}$$